THE NAVY & MARINE CORPS AVIATION SAFETY MAGAZINE

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Approach

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The Navy & Marine Corps Aviation Safety Magazine

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Mishaps cost time and resources. They take our Sailors, Marines and civilian employees away from their units and workplaces and put them in hospitals, wheelchairs and coffins. Mishaps ruin equipment and weapons. They diminish our readiness. This magazine's goal is to help make sure that personnel can devote their time and energy to the mission. We believe there is only one way to do any task: the way that follows the rules and takes precautions against hazards. Combat is hazardous; the time to learn to do a job right is before combat starts.

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Back cover: An EA-6B Prowler assigned to VAQ-140. Photo by PHA Mark J. Rebilas.

September-October Thanks

Thanks for helping with this issue ...
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The Not-So-Friendly Skies

The ranges and military airspace that surround the Marine Corps Air Station Yuma, Ariz., are the best military aviation training spots in the world. With generally clear skies year-round and a lack of population centers, the area is ideal for military-aviation training. That's why the air station is home to the Corps' most important combat aviation-training unit: Marine Aviation Weapons and Tactics Squadron One (MAWTS-1).

However, Yuma has a dark side: it has been deadly to aircrews and aircraft, such as the recent mishap involving Marine helicopters.

BY MAJ. CONSTANT CRAIG, USMC (RET.)

I first went to MCAS Yuma in the summer of 1979 as newly minted UH-1N pilot. I was assigned to MAWTS-1 as the rotary-wing fragger for the upcoming weapons-training-instructor (WTI) course. This was the third WTI, and the plank holders were still there. The course wasn't as sophisticated in those days, and I was allowed to attend the classroom sessions as well as get flight time.

It was also the first time I was on-site of an aircraft mishap — an F4 crew had crashed in the R5702 Chocolate Mountain Impact Area. I had to look for, and found, human remains.

I later was assigned as a search-and-rescue pilot at Yuma. I made 18 rescues and six saves, as credited by the National Search and Rescue Coordination Center, Scott AFB, Ill. I also attended the WTI course and earned the WTI designation. I later was assigned several times as an augment WTI instructor pilot. As a UAV commander, I deployed my unit to Yuma to support WTI courses. As a retired Marine, I have been at MCAS Yuma supporting flight operations as a contractor to the Marine Corps Warfighting Laboratory (MCWL), and yes, we had a mishap (the pilot ejected, and it was mechanical failure and not pilot error).

I also have rescued or recovered remains for all of the other services while stationed there as a SAR pilot. I once rescued the CO of the Navy's Top Gun School on an afternoon just before Thanksgiving.

What causes highly trained, extremely qualified pilots and aircrews to do things that cost them their lives and that destroy aircraft? Several reasons and factors combine into a deadly mixture.

The topography and weather play important roles. Desert terrain, combined with some of the worst heat in the country, produces a challenging environment. It is physically rough on aircraft flying at the edge of the operating envelope. A simple error of calculation such as gross weight, power available to power required, or a shift in winds resulting in loss of tail-rotor authority can combine to make flying around Yuma as dangerous as any place in the world. Also, the missions generally involve ordinance and max fuel loads.

This environment also strains aircrews. Heat, sun and fatigue all play a role. Crews are deployed from homebase and fly demanding missions, while squadrons try to maximize training and qualification sorties. Crews hit the local hot spots and get dehydrated.

We train intensely at night, because it is much more difficult and it is when we fight. Night flying complicates matters. The use of night-vision devices (NVDs) restricts fields of view, diminishes depth perception and can cause spatial disorientation. NVDs also can cause the loss of situational awareness, even in entire flights. The intensity ratchets up several notches. Mission accomplishment becomes the driving factor, often overcoming any other thoughts of the aircrew. A sense of urgency is always in the air.

Then the intangible human factors come in. You really don't know what is happening in someone's personal life. How tired are they? How worried are they about their success or failure as an aviator? Personality clashes may be involved. What are the external pressures on the aircrew to complete a mission? Are they perceived or real? How about the aviator who wants to be the ace of the base and flat-hats all the time? No one really knows at any given time what these factors are. We only see them clearly when it is too late, when we are doing the mishap or JAG investigations.

What causes a breakdown in cockpit resource management and aircrew coordination? Why did both pilots look down and reach for the radios to change a frequency or look at the map? (Yes, I am showing my age.) These examples are from actual mishaps that involved people and aircrew whom I knew. Some were deadly.

We haven't invented new ways to kill ourselves in the air; we just keep repeating the old ones. Several aviation adages keep popping up in my head:

There are bold aviators and old aviators, but no old bold aviators.

Fly what you brief; brief what you fly.

Don't count on luck, count on thorough preparation and planning, so that when you really do need luck you won't have used it all up.

When you run out of airspeed, altitude and ideas at the same time, something bad is about to happen.

A kill is a kill to the enemy, it doesn't matter if they shoot you down or you crash it yourself.

Here are several sticking points to remember. Make sure everyone in the crew and the flight knows exactly their duties and responsibilities, then do them. If it looks wrong, feels wrong, or you think it is wrong, it most likely is wrong. Stop, step back and rethink it.

Finally, look out for each other. There is no shame in saying you are not comfortable with something or someone's actions. Yuma prevents a challenging flight environment, but one that can prepare you for the tasks ahead. Trust me on this one; you do not want to do a casualty call or to be at the funeral of a friend. I did this every single year that I was on active duty.

MR. CRAIG IS A RETIRED NAVAL AVIATOR. HIS PRIMARY AIRCRAFT WAS THE UH-1N HUEY. HE RETIRED IN 1996 WITH MORE THAN 4,000 MISHAP-FREE FLIGHT HOURS. HE IS CURRENTLY A PROGRAM MANAGER WITH A DEFENSE CONSULTING COMPANY AND AN ADJUNCT INSTRUCTOR WITH SEVERAL UNIVERSITIES. HE AUTHORED THE ARTICLE, "CROWDED SKIES, UAVS, AND YOU," APPROACH, DECEMBER 1993.

An Easy Day

BY LT. JOSHUA BROWN

It started just like any other flight in support of Operation Enduring Freedom (OEF). The only thing that made this one slightly different was that it was my annual NATOPS check. We briefed the admin part of our flight as standard and briefed the mission part in depth. We went over the flight schedule "Questions of the Day" and several other NATOPS questions to be sure we properly knocked out my check-ride. We felt fortunate to be in an all JO Prowler crew for the day. We'd been operating in theater for more than a month, so we knew our mission cold. Fly in, tank, do some cool things, tank again, do some more cool things, then tank one more time and head back for the day trap. An easy day.

We completed the northerly ingress route into Afghanistan and climbed to 24,000 feet to rendezvous with our first tanker. I'd set the autopilot to "altitude hold" and was getting prepared to tank on a KC-135, the Iron Maiden. We were still about 80 miles east of our tanker when I saw the flashing Master Caution light. An associated L OIL LOW light also came on, indicating that our port engine had less than 20 percent of its oil remaining. This meant we either had a malfunctioning light or we'd somehow lost a significant amount of oil and could expect things to get worse.

We knew the mission portion of our flight was over, but we still needed to tank; the long transit north had put us out of range of the ship. ECMO 1 and I paid close attention to the engine instruments for any follow-on indications that our left oil system was failing. We didn't need to be engineers to realize that if we were bleeding oil, we would lose oil pressure and then the engine. We hoped it would run long enough to tank and get us back to the ship before anything else had a chance to go wrong. ECMO 1 alerted the controllers of our situation and started to coordinate with the ship, via our E-2 Hawkeye, for an early return.

The tanker already was aware of our situation and was turning to drag us back to the southeast when we started the join-up. We were immediately cleared astern. I had maneuvered to the precontact position when I saw rapid oil-pressure fluctuations on the left engine. I pointed out the gauge to ECMO 1. He told

the tanker we would need to move into starboard observation for a minute to troubleshoot.

Our crew had discussed this very situation following the initial indications; we knew this was the next logical step the jet would take when losing oil. Despite the initial fluctuations being "in-band," they were too rapid and the deflections were big enough to make us consider shutting down the engine. As we settled into starboard observation, the oil-pressure fluctuations rapidly grew out-of-band.

It didn't seem like it in real time, but a lot went into our decision to shut down an engine over hostile territory. Having a discussion as a crew after the initial Master Caution indication allowed us to develop a game plan should we encounter this same situation.

CRM had finally proven its worth to me after having it relentlessly drilled into my head for the first five years of my career. Prowler pilots are fortunate to have three other crew members with NATOPS knowledge and experience to draw on before they make any decisions or have fast hands in the cockpit.

One of our initial thoughts following the first sign of engine trouble was the infamous four-and-half degree, engine-bearing failure our community repeatedly experiences. This failure tears apart both engines and ultimately the Prowler itself. However, everything I'd read and heard in discussions about that failure always mentions the fuel-flow indicator as the first sign an engine bearing is about to fail. Our fuel-flow indications were normal, so we decided not to be too quick to shut it down. It had taken 17 minutes from our initial flashing Master Caution light to our first oil-pressure fluctuations.

We had trusted NATOPS and kept a vigilant scan on our engine instruments, so when it came time to shut down the engine it was not a surprise, and we acted quickly. It took 48 seconds from the initial pressure fluctuations to the time I secured the left throttle. The engine shut down normally, never seized on us and continued to windmill.

There we were, 24,000 feet over western Afghanistan, the nearest divert 150 miles away, low on gas, single engine, and flying on the wing of everyone's favorite tanker. With the engine problems over, our focus shifted to getting on deck, preferably somewhere we could get our bird fixed. We had two options: limp back to the boat or hobble to Bagram, where we had EA-6B maintenance support.

We were joined on our tanker but had yet to take on any gas. That would prove to be more difficult than we had anticipated.

It's hard enough to tank on an Iron Maiden at 24,000 feet with two engines online; it proved impossible single-engine. We didn't have the airspeed on single engine, so we had no chance of plugging-in once we got behind the tanker and into its turbulence. ECMO 1 coordinated with the tanker to descend to a lower altitude, as I struggled to get in the basket. In the descent to 20,000 feet, I took on 1,000 pounds only because I could use the speed going downhill to get in the basket. As soon as we leveled off, I had no chance. We still didn't have enough gas to get to Bagram, much less the boat. We were 50 miles from the egress route, and the decision between diverting to Bagram or going back to the boat had to happen soon.

At this point, the inability to get gas was the only thing that would force us into a land-ASAP situation. Fortunately, we were already headed in the right direction to make it to Kandahar, our closest divert, and we had plenty of gas to get there. The path to Bagram would take us right over Kandahar if we needed to duck in there, while the path to the boat was looking less likely. We didn't have nearly enough gas to make it to the ship. I had taken over the comms with the tanker to coordinate a descent to 14,000 feet in an effort to make the tanking possible. ECMO 1 coordinated our flight routing.

We could only take gas during the descents, which presented a problem making it back to the ship. A tanker escort to the ship would have required coordination with Pakistan to transit well below the assigned altitude (which was unfeasible), followed by a challenging single-engine approach at the ship. With the information we had at hand, coupled with our inability to tank, we had the tanker turn toward Kandahar with the hopes of making it all the way to Bagram.

Fourteen thousand feet was the lowest altitude the tanker felt comfortable, as we headed toward the increasingly mountainous terrain in the northeastern part of Afghanistan. At that altitude, our maximum attainable airspeed was 210 knots when we were behind the tanker. Any slower than 195 knots and the jet began to buffet and was on the edge of stall. We had a small window around 205 knots that allowed us to plug and start taking gas. When we tried to take on more fuel, we got too heavy to stay plugged at that airspeed. The buffet airspeed also increased the heavier we got. Our parameters were 205 knots and a gross weight no heavier than we were at the time; we didn't have a lot of wiggle room.

Somewhere near Kandahar we had taken on enough gas to make it to Bagram. This decision came with the help of the backseaters, who had our single-engine bingo numbers ready to go; another example of effective CRM enhancing our SA. With this decision made, we detached from the tanker that had done so much to help us and had kept our options open. We started a slow, single-engine climb to 18,000 feet for the transit to Bagram.

The flight plan told us we had about a 50-minute transit to Bagram. ECMO 1 and our mission commander, who was in the back seat, were both prior-expeditionary guys, and were familiar with landing at Bagram. We had all the pubs with the frequencies and diagrams. The crew briefed me on what the airfield looked like, and what I could expect to see once we broke out below the clouds. Also, ECMO 1 set our squawk to emergency to make sure ATC wouldn't give us any unnecessary vectors.

BAGRAM SITS AT ALMOST 5,000 FEET above sea-level, which means our single engine would have reduced performance compared to what I'd been used to seeing at the boat. Also, NATOPS recommends a trap for single-engine landings. Could we get an LSO on station? They didn't have IFLOS, and therefore no flying the ball to touchdown. Being a boat guy meant I had no clue how to use the PAPI system over on the right (wrong) side of the runway.

The crew discussed several key things that would help us on the approach. We decided to keep the power up, flare to land as best I could, and roll into the arresting gear — all this while trying not to overspeed the tires landing at a high elevation, and not flying on-speed for the first time in months. Fortunately, the Marines of VMAQ-1, who were deployed to Bagram at the time, had a field-qualified LSO for just such an occasion.

As we commenced on radar vectors for the visual straight-in, I had no idea what to look for. We were in the goo with what I could make out to be high mountains on either side of us, but we had no idea where the airfield was. ECMO 1 pointed out a lone road that leads to the base, and instructed me to keep it coming; the airfield would break out soon. When I finally could make out the runway we were inside 10 miles and still at 9,000 feet, 4,000 feet above the field. We had to quickly lose altitude.

We checked-in with the LSO on-station, and he recommended that even if we miss the gear, we keep it on deck and roll out. With 11,000 feet of available runway, we decided it was a good call. I kept power on the jet as we screamed down toward the piano keys at 200 knots. I wasn't taking any chances with the spool-up time on my single engine at this altitude in case I needed power in a hurry.

The single-engine landing checklist says to retract the speed brakes (as necessary). We deemed it necessary to leave them extended until we touched down, given my desire to keep power on the remaining engine. I modulated the speed brakes and used them like a throttle to get us slow enough as we started to flare. I still had power on the jet and was descending at 1,700 feet per minute, about 200 feet above the airfield. ECMO 1 was calling out my VSI so I'd know just when to flare. I kept an eye on the runway. I pulled back on the stick and chopped the throttle to idle. I put the boards in as we touched down at 155 knots, about 300 feet before the arresting gear, which we rolled into. We were on deck, almost an hour and a half after the Master Caution light first came on.

At the hangar, the hard-charging VMAQ-1 maintainers got to work on our bird almost immediately. The feedback we got back from them later that night was unsettling. Of the 3.4 gallons of oil we should have had in our port engine, less than one gallon remained. They told me that it was good we shut down the engine when we did, because we weren't far away from seizing it. In fact, they were surprised it hadn't seized. I can only wonder what the experience on the tanker would have been had we been dragging a seized engine in addition to the five external stores we carried.

Prowler aircrew often don't have the luxury of a wingman to help them in an emergency or when they find themselves in a sticky situation. We're forced to know the systems cold in the Prowler because unlike newer jets, we have a lot of control over the way they operate and can't always rely on the jet to tell us what's wrong with it. As the Prowler continues to age, we're going to continue to deal with new problems and emergencies. The correct answer may not always be in a checklist. We preach CRM because the Prowler often requires input from all four seats to make the best decisions.

Know your NATOPS and your systems so you can better anticipate what is going to happen when things go south on your next routine NATOPS check. Know your crew and always practice effective CRM, so you're able to draw from their expertise in difficult situations.

LT. BROWN FLIES WITH VAQ-134.

Max Rudder, No Others...

BY LT. SHANE EHLER

As I sat in traffic that seemed to go on forever, all I could think about was how angry my skipper was going to be if I was late to our brief. Anyone who has lived in the Hampton Roads area knows that traffic seems to build out of nowhere on the days when you tend to be running a little behind. With the help of a few shortcuts, I finally made it to the squadron with just enough time to get weather and file our flight plan. Our Hawkeye crew briefed, and we started the customary walk to the plane.

The crew's experience level was high, and we had no doubt this would be a routine flight. Our mission involved stationing about 100 miles southeast of NAS Oceana, over the Atlantic, to support a strike-training mission. As the Hornets began their rendezvous, we set up north of the planned exercise. The pilots set station profile, while the NFOs configured the radar to control the fighters. Ten minutes later, the strike commenced, and we began the same old routine of flying the Hawkeye onstation.

In the cockpit, the skipper and I

Photo by MCS3 J.D. Levite. Modified.

found ourselves teetering around the E-2's "worst airspeed." When I say "worst airspeed," I do not mean on the verge of over-speeding the flaps, nor am I referencing stall speeds. I am talking about the magical airspeed that leads to the most commonly used phrase in the Hawkeye/Greyhound community, "Max rudder, no others." This refers to the Master Caution light that accompanies a Max Rudder caution light on our light panel. This is illuminated automatically to alert the crew of a possible disparity between available rudder authority and airspeed, even though the aircraft may still be in a safe regime of flight. During most of our time on-station, pilots are usually working around this airspeed. More importantly, we always are canceling a Master Caution light, but not until one of the pilots checks for other caution lights and spits out the golden phrase, "Max rudder, no others."

Why in the world did I just describe an E-2 system in great detail, and on a larger scale, who would design a plane with that feature in it? Let's save the answers for another time and another article. For now, I want to put you in the boots of E-2 pilots who have to fight this constant Master Caution, which desensitizes the aircrew when dealing with a light that should be causing the seat cushion to move a little. Instead, as aviators we always find ourselves saying over and over our common catchphrase, "Max rudder, no others." Each time, we fight the urge to not look and check all other lights that can cause the Master Caution to come on, and just spit out "Max rudder, no others" before canceling the Master Caution light.

Now that I'm off my soapbox, I'll continue with the story. You can probably guess that the max-rudder light can occasionally mask a larger problem in the cockpit and surprise the aircrew.

About 15 minutes into the mission, the Master Caution light came on, and just as my skipper was halfway through his required verbiage, he paused and slapped me on the shoulder. I looked up and saw him pointing at our overhead panel. Lo and behold, our port main Prop Pump light was on. This light indicates that the propeller is losing hydraulic fluid, which is used to control the blade angle. More importantly, this fluid drives the propeller to full feather during an engine shutdown. Without full feather (minimal drag) on a propeller, the aircraft is very difficult to control and in some cases, uncontrollable. As a community, we have lost two aircraft and one aircrew in the past four years because of a propeller not going to full feather on a shutdown. The main pump light is a critical light and it had, against all odds, illuminated at exactly the same time as the Max Rudder light.

In the cockpit, the skipper and I immediately went through our NATOPS procedures to make sure the propeller was operating, which eventually led to us shutting it down. As we held our breath, the port engine spooled down and the port prop went to full feather. After 20 minutes of transit, the skipper and I took a single-engine arrested landing at NAS Oceana.

THE INITIAL INVESTIGATION by maintenance pointed to a worn propeller cone as the cause of the leaking fluid that led to the main Prop Pump light. In the 20 minutes it took us to land, all of our hydraulic fluid had leaked from the port prop-pump housing. The following day, we discussed the possibility of us not seeing that pump light when it came on, because we usually assume that the Master Caution was only coming on because of the Max Rudder light. Had we not recognized the light right away, who knows how long it may have gone unnoticed? Who knows how long it would have taken for enough fluid to leak out to inhibit us from feathering that prop? The E-2C has mechanical backups to help in this situation, but (as with most backups,) I'm happy they are there and hope to never need them.

As in any aviation-related incident, we try to learn from our mistakes and take lessons learned back to the ready room. In this case, our maintenance learned a little more about the prop system, and as aircrew we gained experience dealing with a single-engine Hawkeye. The main takeaway for everyone else is that no matter what, "fly how you train."

From day one in the FRS, E-2C/C-2A student pilots are taught to check for other caution lights that may accompany the infamous Max Rudder light. All of us have entertaining stories with certain simulator instructors who have helped to reinforce this habit pattern. This training may have saved us from turning a bad day into something much worse. Good CRM, a good scan, and sound procedures contributed to us handling the situation. No matter how mundane or routine the flight, remember to do the basics and be on top of your game. You never know when your platform's "Max Rudder light" may surprise you.

LT. EHLER FLIES WITH VAW-126.

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Kick the Tires

BY LT. DAN COOK

We were scheduled for a flight with a full mission crew and enough gas for nine hours. We expected good weather the entire flight. The mission included a planned wire-out in an op area over the water.

The copilot was in the left seat and I was in the right seat. We had a third pilot, but he was not qualified to participate in a critical phase of flight. At about 100 knots on the takeoff roll, the copilot felt unusual control forces that required rudder inputs. The aircraft began to pull to the left. The copilot gradually increased right rudder input until he had slightly overcompensated. After he took out some rudder input, the aircraft again slightly pulled to the left. With winds negligible, using 80- to 90-percent rudder input was not only out of the norm, but also was uncomfortable.

The decision to initiate an abort was 50/50. With a maximum abort speed of 122 knots, the time between recognition and a potential abort decision occurs within seconds. Even with the odd inputs, we still maintained centerline. As the aircraft commander, the rudder inputs felt as if the copilot was dancing with the pedals, but because we were on centerline, I decided to continue the takeoff. I noticed the aircraft felt jerky, but my decision-making process was hampered because I didn't have direct control of the aircraft.

I noticed the aircraft felt jerky, but my decision-making process was hampered because I didn't have direct control of the aircraft.

As we rotated and started to clean up the aircraft, our communications crew was the first to notice an acrid odor. As the fumes intensified, they smelled like

burnt rubber. Seconds after the call was made to the flight deck, we picked up the smell. We were passing through 2,500 feet on our climb-out, and had just received clearance to climb to 15,000 feet.

I immediately directed everyone to get on oxygen and initiated our Fire, Smoke, or Fumes in Aircraft Interior checklist. I called ATC and told them we'd level off at 4,000 feet because of the fumes in the aircraft. I requested a vector to a radar downwind in case we needed to make a quick landing. ATC complied and gave us a downwind vector. We engaged the autopilot to help with our situational awareness.

As we leveled off, the checklist was activated. The cabin sweeps yielded no indications of overheating, smoke or fire. Our flight engineer began working the outflow valves to help dissipate the fumes. Within a minute all indications of fumes had vanished. I secured from the checklist even though we still had not identified the source. I gave instructions to stay vigilant in case the fumes returned.

The copilot and I thought we'd had a tire issue because of poor aircraft controllability and a smell that resembled burnt rubber. Because we already had oriented our aircraft for an emergency return, we asked tower for a low approach to inspect our gear. Tower said that runway 30 would be best for their view and cleared us for the visual approach. We completed our low approach. Tower reported that all indications looked normal. We determined that we had no inflight problems and continued.

Because we suspected a potential flat-tire issue, we immediately scratched the idea of any touch-and-goes. However, we could not find a reason why not to continue with the mission; we still had 8.5 hours of fuel onboard. Landing heavy was the least practical option and would only compound the issue. Dumping fuel appeared to be needlessly rash and unnecessary, as our situation did not indicate we needed to land immediately. We had 3.5 hours of fuel to burn down to reach landing weight, so we didn't think flying over the local area had any safety advantage over flying our intended mission profile. We decided to fly the mission, RTB, and full stop at our normal landing weight.

After completing work in the op area, we headed back to base and read the Landing with Flat Tires and Ground Evacuation checklists. The Landing with Flat Tires had one sentence that immediately stuck out, and it also happened to be the first one: "If any or all tires are flat, land the aircraft normally with the gear down. Reduce gross weight and landing speed by performing FUEL DUMP checklist."

There is no further guidance provided in NATOPS. It just tells you to reduce weight by dumping. At first glance, I did not think dumping would be necessary. We would land with normal procedures (which happened to go with my original logic to not dump). However, the more the copilot, the flight engineer, and I talked about it, the more uncomfortable we got. We did not know the problem with the aircraft.

In addition to tower's report that our gear looked normal, our flight engineers also inspected the gear through the landing-gear-inspection windows. They found nothing out of the ordinary. Although our gut feeling had told us the takeoff did not feel right, we simply had to assume that something was wrong. Generally, you can't go wrong by erring on the side of caution.

One visual inspection that could not be made by us was of the nosewheel tires. The viewing window only indicates the alignment stripes, not the gear itself. I decided to treat the aircraft as if we had a flat nosegear tire. Even though the copilot had right rudder in, we did not want to try and "game" it by thinking we had a left main tire out, and try land to the right of centerline. For all we knew, the aircraft might veer to the right on landing. With only the visuals on the mains, we needed to increase our odds by preparing for a flat nosegear tire. This decision assumed that tower could identify a shredded or blown tire. However, not all flat-tire conditions can be visible from that distance. We went with the safe bet: aim for centerline, keep the nosegear off-deck as long as possible, and anticipate the original tendency to veer back to the left.

We had discussed several times whether to dump fuel. It was possible we could go off the runway, maybe not a great chance, but enough to make sure we were in the best possible configuration. We had no reason to compromise on such a huge safety concern. The lighter we are, the slower we can get, and it's less fuel to turn us into a fireball screaming off the runway. The checklist said to dump, but not how much. I interpreted that as aircraft-commander discretion, and chose 25,000 pounds of total fuel remaining, which is one hour of flight time. This would make the jet light enough, but also give us options if the situation changed. If we didn't

reduce weight, we would land just below maximum-landing weight. We already had extended our crew day past 12 hours, and I believed flying another three hours to burn gas was not smart. I felt fatigued and knew it was time to get on deck while we still were reasonably fresh behind the controls.

WE DECIDED TO RUN the Fuel Dump checklist, get vectors to the ILS and set up for a full stop. The crew prepared for a possible ground evacuation. After an uneventful approach, I landed using normal procedures with the exception of holding the nose tire off the ground, as stated in the Nose Gear Tire Flat procedures. After applying max braking, the control forces felt normal. We came to a full stop, and were instructed to stay on the runway. The fire fighters inspected the jet, along with our flight engineers. Everything was found to be safe, and we taxied to our line.

During postflight, we found damage to the right nosegear tire. There appeared to be burn marks and abrasion lines on the right side of the tire, and also a quarter-sized chunk of rubber missing. We still do not know why the control forces acted the way they did. Our best guess is that the nosegear was somehow cocked to the side and created friction. We don't know why that much rudder was needed.

The copilot and I are the senior qualified guys in the squadron. Things could have gone differently had there been less qualified pilots in the seats. We were not even past 3,000 feet on climb-out when we had everyone on oxygen, a handful of jet, ATC constantly yammering at us, and were trying to run an emergency checklist. Events happened fast and furious, and we had our hands full.

Another key point to understand is that an actual situation does not always go like our simulated emergencies do. Fortunately, we were in the takeoff phase and everyone was fresh and alert, which made running the checklists more efficient.

The decision to abort is another critical part of this scenario. The time between 100 and 122 knots comes quick. We simulate aborts all the time, but normally you have an obvious failure or secondary indication. I don't recall ever having to abort for unusual rudder inputs. Not everything is going to happen like in the simulator. We kept centerline, and a couple potatoes later we were airborne. Had we felt a problem at 60 knots, we probably would have aborted the takeoff. There was no clear reason necessitating an abort, which made the decision that much more difficult.

I want to emphasize is the importance of CRM. The decision to dump fuel wasn't our original plan. Don't be afraid to change your way of thinking or logic. Most pilots may be uncomfortable with that idea. At face value, the decision seems odd considering that we elected to do a mission flight and then dump rather than dump and land immediately.

We scrutinized the meaning of that checklist during the remainder of the flight and put safety ahead of everything else. I signed for the jet and was responsible for the crew's safety. As the flight went on, I felt this was the safest decision.

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Hyd Games *Over the* South Pacific

BY MAJ. BRIAN DENNIS, USMC

Our squadron was two-thirds of the way through an epic WestPac deployment and firing on all cylinders. It was time to make the much-anticipated trip to Townsville, Australia for Exercise Talisman Sabre.

Because I had "popped" on the schools list, I would be leaving deployment early to return to CONUS, check out of MCAS Miramar, and move my whole life to Quantico, Va., where I would be attending Command and Staff College. I was nearing the end of an unforgettable three-year tour with the Black Knights of Marine Fighter Attack Squadron 314. Having spent my previous two years as the AMO and OPSO, I was enjoying life as a pilot for my last month in the squadron. The Black Knight's trusty stable of Lot 8 and 9 FA-18A++ aircraft had been performing well, and I'd been flying my share. I would make the push to Australia, have a few days with the bros, and then hop a commercial flight to the States.

The squadron had just wrapped up nearly three months of hard flying out of Kadena Air Base in Okinawa, Japan, culminating with our participation in MAWTS-1's MDTC (Marine Division Tactics Course). The plan was for the skipper to lead the first cell of six jets, and I would lead the second cell of five jets (one plane was hard down and remained in Kadena with a small repair det). The TransPac plan had us flying to Guam, where we'd spend the Fourth of July weekend. We'd then press on to Townsville via some circuitous routing through the islands of Indonesia. We had to avoid the overflight of any land mass for diplomatic-clearance restrictions.

The tanking plan was to have one KC-10 per cell to Guam, and then one KC-10 and two KC-135s per cell from Guam to Townsville. This creative routing makes for an eight-hour flight. We also had an Air Force C-130 hauling our trail maintenance folks along with the parts pack-up. Finally, we had a squadron pilot riding along in each KC-10, with a NATOPS manual, to act as a book-reader in case of an emergency.

The flight to Guam from Kadena was uneventful with the exception of my cell having to slide 24 hours to the right because of maintenance issues. The skipper's cell made it out of Guam on time, but my cell had to slide yet again because several jets didn't want to cooperate. Three days and one frantic parts run later, my cell launched from Anderson AFB, Guam, for the almost 3,500-mile trek to the "Land Down Under." I would land in Townsville with enough time for a last flight with the squadron in Australia during the range-familiarization day. The multiple slides had ended that plan, and my last flight before checking out of the squadron would now be this joyous eight-hour leg to Townsville. At least that was how it was supposed to go.

The first few hours of the flight were routine. Everyone was handling the Iron Maiden quite well. We were to tank off of the KC-135 for the first few aerial refuelings (ARs), and then detach him so he could head back to Guam. The much easier-to-deal-with KC-10 would drag us the rest of the way to Townsville and then to Darwin International.

Photo by Cpl. Claudio A. Martinez. Modified.

I kept busy during the flight by continuously tracking our diverts and making sure the fuel plan was tight. We were in and out of the clouds for the middle hour or two, but we mostly enjoyed a beautiful day in the South Pacific. I allowed myself to occasionally daydream about the tall glass of Victoria Bitter I'd have while scouting the local bar scene. We were about 50 miles from the point where our divert in the southern Philippines would roll forward to make Darwin our primary emergency divert. That's when I got the "deedle, deedle."

"What have we got here?" I wondered. The master-caution light was staring at me, along with a HYD 1A caution (indicating a problem with one of the four redundant hydraulic circuits) on the left digital-display indicator (DDI). I had briefed our cell about how we'd treat "land as soon as possible" and "land as soon as practical" emergencies. As the flight progressed, I'd call out where our land as soon as possible divert was as it changed. After breaking out the pocket checklist (PCL) and conferring with the rest of the flight, I decided to press forward toward Darwin and monitor the situation.

There were no associated flight-control system (FCS) Xs or BLINS (codes which explain exactly what component is having a problem). In the Hornet, the HYD 1A caution tells the pilot that the individual circuit pressure is below 1,500 PSI. This is what happens when a leak occurs and the HYD 1 fluid reservoir is down to 60 percent of full. This can also happen if the HYD system is not serviced properly between flights. The corrective action directs the pilot to simply maintain airspeed below 350 knots and to land as soon as practical. If the reservoir level-sensing (RLS) system has done its job, the leak will be isolated and there is no degradation to the aircraft's flying qualities. At this point, we were 400 miles north of Darwin, which equates to about 48 minutes of flying time.

About 15 minutes later the HYD 1A caution disappeared and was replaced by a HYD 1B caution. This means that the RLS could not isolate the leak in the HYD 1A circuit and the HYD 1 reservoir is down to 32 percent of full. The system shuts off the HYD 1B circuit to try to isolate the leak. We were a little more than 30 minutes from Darwin, still our closest divert. As a flight we discussed the procedures and worked crew resource management (CRM). My senior section lead backed me up with the notes. I was still in a land-as-soon-as-practical situation, and I still needed to remain below 350 knots.

I read ahead to the combined HYD 1A/HYD 1B procedures. If the RLS doesn't isolate the leak, once the reservoir is down to 4 percent of full it turns back on both systems and displays no cautions. In this scenario, you will likely be forced to shut down the corresponding engine, as the HYD pump is spinning with little to no fluid in it and poses the risk of a fire. The HYD pump is mounted on the airframe-mounted-accessory drive (AMAD), which is in turn powered by the rotating left engine; you would subsequently have

no HYD 1 system. In this case, the aircraft had little degradation to basic flying qualities as everything was run by HYD 2 via the right engine.

The HYD 1B caution remained until we were about 10 miles north of Darwin. Our cell discussed the merits of landing in Darwin, or perhaps flying another 150 miles to RAAF Base Tindal (for possible Aussie RAAF Hornet support).

This scenario raised the question of what exactly "land as soon as practical" means? NATOPS states, "Land as soon as practical means extended flight is not recommended. The landing site and duration of flight is at the discretion of the pilot in command." This statement gives us a lot of latitude.

I considered pressing to Tindal for Hornet support, as I wrestled with the thought of whether the RLS would isolate the leak for me. A better call was to divert into Darwin, a field that would have me on deck about 20 minutes sooner than going to Tindal. The jet then decided to jump in and make the decision easy for me. After another "deedle, deedle," the left DDI showed the following cautions: HYD 1B, HYD 2A, FLAPS OFF, RUDDER OFF, FCS. I confirmed that I was more than 300 knots per the immediate-action item required for the FLAPS OFF caution.

The briefed plan was for me to take Dash 2 with me if I had to divert. We split-off from the tanker and once again started the checklists. I declared an emergency and began to coordinate our landing in Darwin. We stayed up the tanker frequency to have our book-reader back us up with the big NATOPS. ATC was busy and our situational awareness (SA) was degraded; we had too many people talking on both radios.

My wingman and I pushed off to another tac freq where we could go through all the procedures. Both of my leading-edge flaps were X'd out, along with my right rudder. When you look at the Hydraulic Subsystems Malfunction Guide in the PCL, you find this is exactly what you'd expect to see. The big-picture game plan is to make a half-flap, straight-in approach to an arrested landing, after conducting a controllability check at altitude.

My wingman and I did a good job with the CRM as we set up for the visual approach. Darwin has only one runway to land on (the big runway is 11,000 feet with BAK-12s on either end, the small runway is 5,000 feet with no gear). I reviewed the emergency-landing-gear-extension procedures, while I had him check the limitations on the BAK-12. He came back with 160 knots; shouldn't be a problem. I told him to plan on pushing ahead of me and to land first, as I had no idea how long I'd have the runway clobbered after my trap. He helped me review the notes, and we confirmed the hook skip game-plan. I decelerated to 160 knots at 15,000 feet, and put the flaps to half to facilitate the emergency-gear extension and the controllability check. The nose and right main gear immediately came down.

What probably took only a couple extra seconds — but seemed like an eternity — was the left main gear showing down and locked. The hook was down and everything looked good. On the approach frequency, I heard a couple of international flights inquiring as to how long the runway would be down after my trap. They were concerned with holding time and divert fuel.

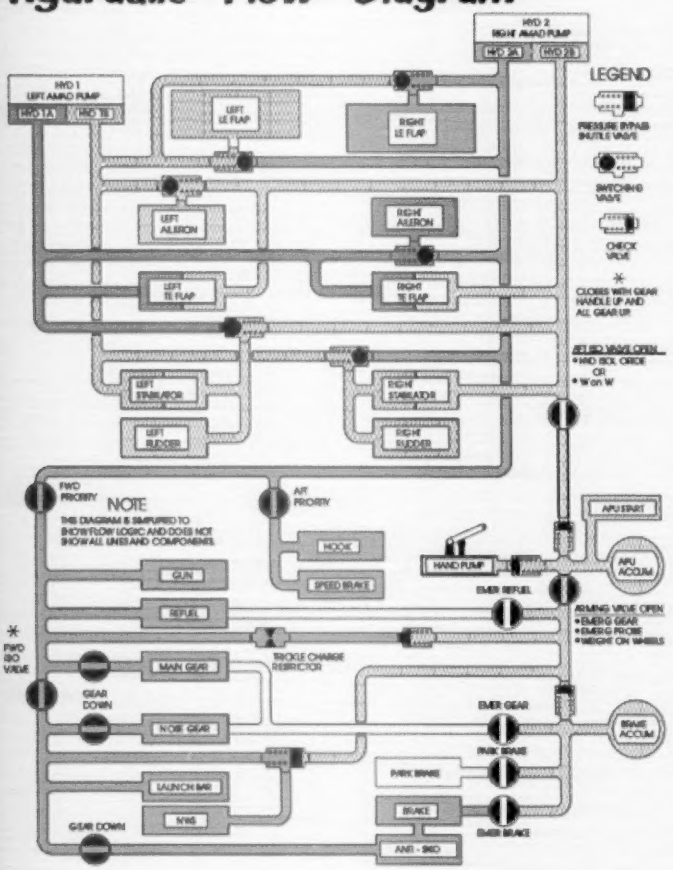
WITH ALL CHECKLIST ITEMS COMPLETE, the jet flew just fine. I descended to set up for a 10-mile visual straight-in. As I took a quick inventory of the left DDI, I noticed the HYD 2A caution was gone, the RUDDER OFF caution was gone, and the right rudder was no longer X'd out. I looked down and saw both HYD needles steady at 3,000 PSI. To confirm that I actually had HYD 2A back online, I popped the speed brake out for a second — it worked. My mind was unable to process why my HYD 2A was working. Meanwhile, I thought about the international flights stacked above me.

I conferred with my wingman about trying a normal landing rollout to clear the runway for the heavies behind me. By now I had dumped down to 5,000 pounds of fuel, and my approach speed was 155 knots; the jet flew smooth and steady. I told him that I wanted to touch down and look for nosewheel steering (NWS) to come alive in the HUD as I assessed braking action, my line-speeds, and the deployment of my speed brake. This would indicate that HYD 2A continued to work and I'd continue the rollout. Upon touchdown, if anything looked odd I would go to max-power, get the jet airborne and then take the arrested landing. My wingman concurred and confirmed that he was clear of the runway.

I went through my landing checklist one more time and confirmed my hook was up. Tower gave the winds and cleared me to land. I had about 10 knots in the face, which helped as well. As I touched down on runway 11, the NWS came alive in the HUD. The speed brake came out, and the braking action felt good. I had my line-speeds made easily. I decelerated to a safe taxi speed and cleared the runway. My wingman was waiting for me, as

I pulled off the active and contacted ground. We taxied to park, and I quickly prepared to shut down. But, before I shut down, he told me that the right aft fuselage of my aircraft was covered in hydraulic fluid and appeared to still be leaking. After shutting down, I jumped out and saw that both of the hydraulic fluid gauges were low. I took comfort that we got the jet on deck, and our trail maintenance det was scheduled to land in Darwin a few hours behind us.

Hydraulic Flow Diagram



What happened? A seal in the right rudder hydraulic servo had failed. Because the right rudder is powered by HYD 1B, this failing circuit began to deplete the HYD 1 reservoir. The RLS always shuts off the A-circuit first when trying to isolate a leak. This action obviously didn't fix the problem, so the hydraulic fluid continued to be pumped overboard. At 32 percent of capacity, the RLS shut down HYD 1B to isolate the leak. The right stabilator/rudder-switching valve performed as advertised and began powering the same leaking servo with HYD 2A. As the leak continued the HYD 2 reservoir hit 60 percent, and RLS kicked in taking the HYD 2A circuit offline, leading to the combined HYD 1B/HYD 2A cautions.

Why did HYD 2A come back online after the emergency-gear extension? The arming valve is opened when the gear is emergency extended. This combines the charges of the APU accumulator and the emergency-brake accumulator to lower the gear. What I didn't mention earlier is that I had selected emergency brakes as part of my hook-skip game plan. This opens a valve, which effectively introduces these combined charges into the HYD 2A subsystem via the forward isolation valve. The HYD 2A subsystem essentially got enough of a boost to exceed the 1,500-psi threshold required to get it back online. The problem is that this didn't fix the leak, and the HYD 2A caution eventually would have returned as the fluid continued to purge.

What did I learn? This flight made me take a hard look at what I'll do with emergencies that lead you to the words "land as soon as practical." This is a great subject to broach in the ready room. Ask around and see what aircrew would do with various "land as soon as practical" scenarios. Some situations obviously are more varsity than others. The right answer with cycling HYD cautions is to get that airplane on the ground. In hindsight, the late decision to switch to a normal landing rollout game plan probably wasn't the right call. I was simply too worried about clobbering the airfield with my arrested landing. They've got gear there for a reason,. If you need it, use it.

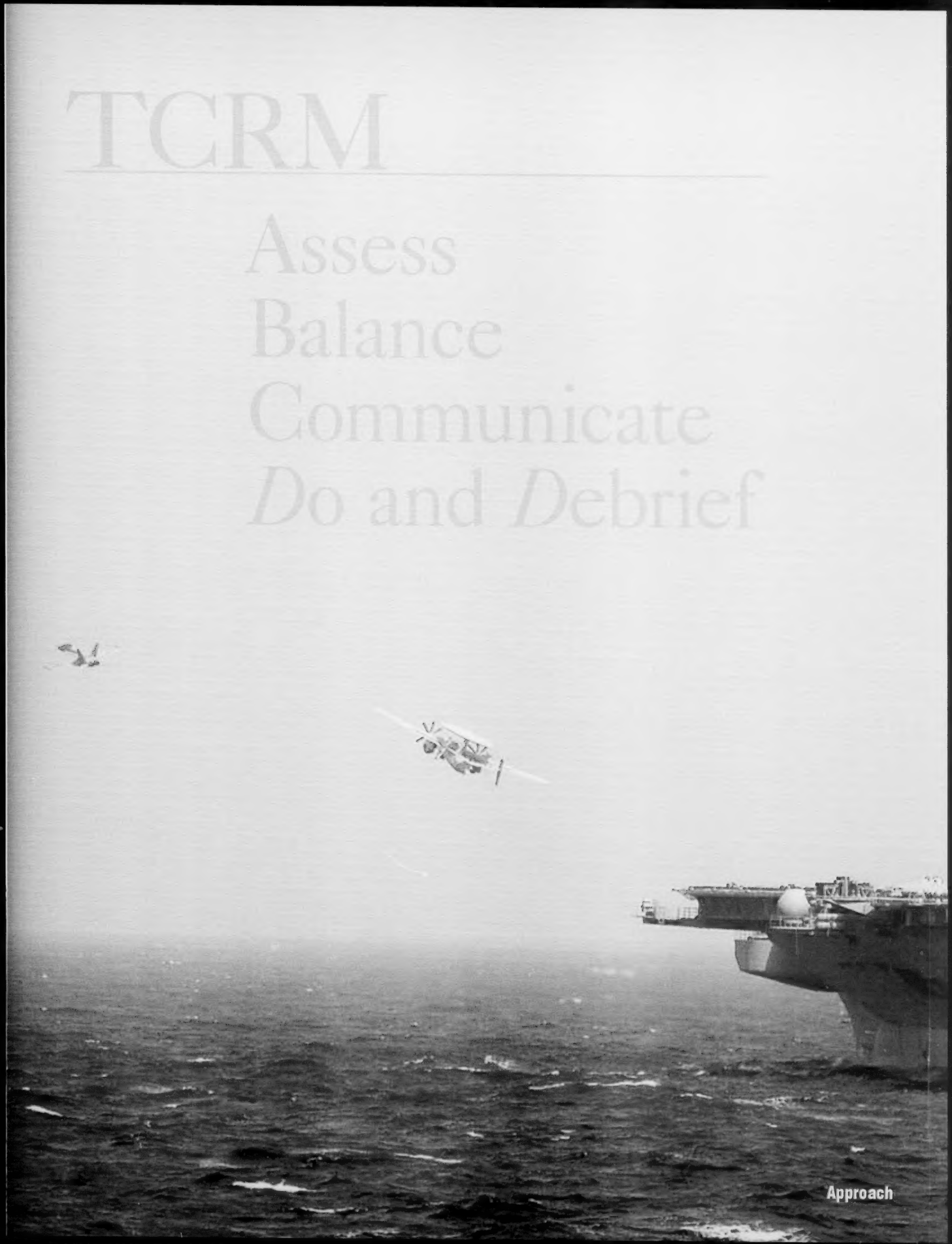
A more conservative decision would have been to take the arrested landing. Although the HYD 2A stayed online long enough for me to land and park, it could have failed again, resulting in more problems and more chances of me punting this into the stands. Finally, I learned a lot more about the FA-18 hydraulic system. I've flown this aircraft for more than 10 years. But, I didn't fully understand how and why hydraulic leaks can transfer from HYD 1 to HYD 2 because of the configuration of the switching valves and servos.

As we continue to fly these glorious war machines well past their designed flight-hour limits, we'll continue to see components fail, perhaps sometimes in new and unexpected ways.

MAJ. DENNIS IS CURRENTLY AT COMMAND AND STAFF COLLEGE IN QUANTICO, VIRGINIA.

TCRM

Assess
Balance
Communicate
*D*o and *D*ebrief



September-October 2012

Rotor TIP-TO-TIP With a Seaknight

I have been retired now for five years. This event occurred on April 4, 2003, while I was detached aboard USS Camden *(AOE-2). This incident has caused me a great deal of latent anxiety, and it has taken several years for me to talk about it in an open forum.*

BY MATT KNOWLES

We stand at attention as the commanding officer enters for tonight's operations-intelligence brief. I am the detachment operations officer, attending with the detachment OinC, for what seems like the 1,000th briefing.

We have been deployed onboard the USS *Camden* (AOE-2) for 271 days, and the tempo set in these early days of Operation Iraqi Freedom (OIF) is intense. This brief is particularly lengthy. Tomorrow, we will rendezvous with USS *Abraham Lincoln* (CVN 72) and the hospital ship USNS *Comfort* (T-AH-20) in the North Arabian Sea AOR for a con-

nected replenishment (conrep). Immediately, my ops planning kicks in and I am concerned that the medevac of casualties to USNS *Comfort* will prove difficult to simultaneously conduct with vertical-replenishment (vertrep) operations. My concern is validated later; the whole operation will last 28 hours, resulting in nearly continuous flight operations.

The brief concludes, and I confer with the OinC on what he would like to do. He insists that we should use both aircraft. I counter that there will be intense helo activity from the Army medevac units. Having that second aircraft could add to what is already a congested and confined airspace.

We would typically use both detachment aircraft during this stage of flight operations. When feasible, one aircraft acts as a sea surface surveillance and control (SSSC) on point, in front of, and surrounding the replenishment

group. Once released from SSSC duty, they join the other aircraft to conduct vertreps. We share these duties with the HS squadron when replenishing the CV units.

The OinC and I discuss how to use the aircraft for the mission. I insist on one aircraft, mostly because we have been briefed on the known medevac traffic. Also, the flight deck on *Comfort* is situated well forward on the ship, making the vertrep more difficult than having the typical crossdeck configuration. He reluctantly agrees, and the plan is to launch one aircraft.

Camden will steam to the southern AOR, meet with USNS supply ships at night, and transfer stores via conrep and vertrep to our ship. Then *Camden* will steam north to meet with the carrier or amphibious battle groups and continue conrep-vertrep operations. The crew rotation is based on four-hour missions, then crew rest for four hours. My crew is first in the rotation and will end with the late night hop. We will begin with *Comfort* and several ancillary ships and end with the USNS supply ship later that night.

The detachment is deployed aboard *Camden*, which is a large ship, more than 53,000 long tons (when full) and 796 feet in length. *Comfort* is a much larger ship. At more than 69,000 long tons and 894 feet, it makes *Camden* seem small. Once *Comfort* comes alongside the starboard side of *Camden*, there seems to be a huge white wall of steel next to us. Our flight deck sits well below the weather deck of *Comfort*. This makes the drop approach for the vertrep particularly challenging. You have to approach from the starboard side of *Comfort* then swing the tail around (180-degree button hook) and make the drop with the nose of the aircraft pointed outboard to the starboard side. Drop, lift, and depart to starboard, and then fly around the stern of *Comfort* and approach *Camden* up the stern. This is a very time-consuming and lengthy pickup-and-drop sequence.

The vertrep progresses slowly. Every third or fourth drop, we have to stop because of incoming medevac aircraft. There is no way to conduct multiple aircraft vertrep operations while alongside *Camden* in conrep. One half of *Comfort's* deck is clobbered with the vertrep stores we have just dropped. We keep the forward half of the flight deck open to receive the medevac aircraft and fuel for our aircraft. During one of these breaks in the vertrep, the flight-deck crew of *Comfort* is able to clear the aft section of the flight deck. This provides a good time to take on badly needed fuel, allow *Camden* flight deck to stage more goods, and still allow the Army medevac aircraft to drop the wounded.

We sit on the aft section of the flight deck and top off. At the same time, a medevac aircraft makes a drop and departes. I am sitting right seat, the copilot has the controls and will make the take off. Gas, gauges, warning/caution advisory panel are checked, and with the green deck, we lift straight up.

Just as we rotate forward to depart, filling our windscreen rotor paths, tip-to-tip, is Sideflare 50 (SF 50) — our other detachment aircraft. We are nose to nose and closing within 20 or 25 feet.

I GRAB THE CONTROLS in an act of self-preservation, pull the collective to my armpit, and wrench the cyclic left (toward *Comfort's* tower-superstructure). Seconds seem an eternity. My aircraft, Sideflare 63 (SF 63), responds with what I swear is a groan and sigh, sensing its own demise and ours. Nr droops, the aircraft lifts and tilts left. Everything slows down. I see through my chin bubble what seems to be each turn of the other aircraft's rotor pass down under and to my right. I brace for impact; it seems imminent.

Miraculously, we didn't hit the other aircraft. As my senses focus more forward and outside, my copilot shouts, "Look out left. Look out left!"

The life-saving climbing left turn is putting us right into the path of the ship's forward superstructure. With the collective still high into my armpit, I jam the cyclic forward and slightly to the right, I have no idea of the location of Sideflare 50. Our aircraft responds with a forward pitching jolt, and we are clear over the open ocean.

Fear and adrenaline turn to fury. The OinC had launched the second detachment aircraft, had not notified me, and apparently surprised *Comfort's*

I see through my chin bubble what seems to be each turn of the other aircraft's rotor pass down under and to my right. I brace for impact; it seems imminent.

LSO as well. The ensuing radio communications between SF 50 and SF 63 probably are tantamount to insubordination. I let loose with a flurry of disparaging remarks to the OinC, who was the HAC in SF 50. Apparently, he had taken advantage of a staging break on *Camden* and rolled out SF 50 in an effort to speed up the vertrep process. We apparently had been talking with the Army aircraft on a separate frequency and had missed the traffic call from *Camden*'s tower.

Over the open ocean, I check in with my crew. Everyone is severely rattled. The crewchief had been seated in the forward seat looking out the starboard hatch of the aircraft. He says he was counting rotor blades as we passed up and over SF 50. He believed, as I did, that impact was imminent. The second crewman was on the port side of the aircraft, having his own anxiety fit about the impending hit with the tower superstructure. Apparently, both were on ICS warning of the impending collisions. I cannot recollect hearing these warnings on the ICS.

My copilot stares straight ahead. I think he's contemplating what had just happened. He says he is OK but is equally upset over the incident. We discuss how I forcefully took controls from him, and that he hadn't resisted. He felt as though he was a "Deer in the headlights," not knowing what the corrective action was going to be. We are spent, but the op tempo and the fact that the other crews are scheduled to fly another replenishment mission later, means that we can't discontinue the replenishment of *Comfort*. We have to jump back into the mix.

In spite of the near miss, things go from bad to worse. The OinC remains airborne; the Army medevac aircraft are constant. It looks from a distance as if both ships were hives and the bees are just swarming around them. When the Army aircraft clears, both Sideflare aircraft try to conduct the vertrep. However, this plan was awkward and both aircraft are in a one-legged dance competition. At one point, the OinC flies straight into the flight deck from starboard to port, dropping the load, then lifting straight up and over the superstructure of *Camden*.

More than once, one aircraft perches on the starboard side with a load waiting for the other aircraft to drop and go. More fury ensues between the OinC and myself. The time has lapsed enough to get the other crew into SF 63 and not upset the remaining schedule. We continue the one-legged dance, waiting for *Camden's* deck to clear to let my crew hot seat. My crew and I log almost eight hours.

In an after-action debrief with the OinC, it was clear that the apparent communication breakdown had occurred between SF 50 and *Comfort's* tower. Sideflare 50 had launched from *Camden*'s flight deck, flown around the stern of *Comfort* and approached from the starboard side, close aboard. They heard the green-deck call, which was intended for SF 63, and continued inbound. From the vantage point in the cockpit of SF 63, looking aft on the flight deck, it was difficult to see down the starboard side of the ship even though the nose of our aircraft was pointing outboard to starboard. The coincident green-deck clearence understood by both aircraft created this dreadful meeting over *Comfort's* flight deck.

MR. KNOWLES IS A LINE CAPTAIN FOR A HELICOPTER EMERGENCY MEDICAL SERVICE IN SAN DIEGO, CALIF.

604, You're a Divert

BY LT. BENTON SECCOMBE

We had just returned to the 5th Fleet AOR for the second time in six months, and I already was on autopilot. It was our first day back to flying in Operation Enduring Freedom (OEF). I was the mission commander on a day, airborne-early-warning (AEW) hop designed for pilot currency. We weren't going over the beach, and we were one of three Hawkeyes working around the carrier. We expected an easy day.

I was the squadron's junior mission commander. The rest of the crew included the junior carrier aircraft plane commander (CAPC) and three level-one aircrew, with as little as three months in the squadron. The brief, preflight and launch went smoothly. We assumed station profile at altitude and did some basic trouble-shooting of our systems.

On our return to the carrier, our CAPC checked in with marshal, who had us proceed to the Case I stack at 3,000 feet. As we approached the carrier, the CAPC recommended that before we start dumping fuel to reach max trap, we drop the landing gear.

I realize this seems strange, but we had our reasons. Over the past two days, we had three aircraft drop their landing gear and had unsafe indications. Granted, on each of these events, the crews were able to trouble-shoot and get the gear down and locked.

As we approached the stack, our pilot slowed to gear speed, and with bated breath, he lowered the landing-gear handle – silence.

Then I heard, "Uh, oh," over the intercom system.

As we had feared, our port mainmount was still barber-poled, while the other two indicated down and locked. Our pilot looked aft and noted the gear appeared to be down and locked, but he couldn't confirm it. We quickly began to troubleshoot, but to no avail. Because the problem had been widely discussed over the last few days, the emergency-procedure (EP) execution went smoothly, but unsuccessfully.

We contacted our tower representative to discuss our malfunction and report that the EP had been completed. Immediately, on a different radio, I heard the familiar voice of my CO, who had just launched on an OEF mission. He had me switch to our TAC frequency.

I now had rep in one radio, tower in a second, marshal in a third and the second Hawkeye in another. Everyone had recommendations and instructions for us. A CRM nightmare ensued. My CAPC talked to rep and marshal to coordinate a join-up with a tanker, while I asked our CO for guidance. All the while, we were talking internally to each other about what the other was hearing. We were now holding four different simultaneous conversations.

The going-in assumption when flying in the North Arabian Sea is that you are "blue water," meaning no divert is available, and the boat is the only available place to land. Actually, several foreign fields are within divert range, but they're used only in extremis, and with direction from the chain of command.

Not surprisingly, the tanker's visual inspection provided no conclusive results. The port main gear still appeared down. I instructed my air-control officer (ACO) to look up the bingo numbers, both dirty and clean. The pilot discussed the possibility of using the emergency-extension system to get the gear down and locked. Then we discussed with the tower rep the ramifications our actions would have on those numbers.

That's when we heard a voice from the almighty, "This is the captain, 604, you're a divert."

Silence. Then rep, tower and our TAC frequency exploded with instructions and advice. My CAPC and I tried to weed through the plethora of information and determine what was important. It didn't seem to matter though. We all were thinking the same thing, "Now what?"

Immediately, on a different radio, I heard the familiar voice of my CO, who had just launched on an OEF mission. He had me switch to our TAC frequency. I now had rep in one radio, tower in a second, marshal in a third and the second Hawkeye in another.

Our rep echoed the divert call. Fortunately, we already had calculated the bingo numbers. We raised the gear and flaps, squawked emergency, and headed for one of several air bases in the area used for diverts.

During the transit, the sheer distance from the field, along with the language barrier, made it difficult to reach and understand the approach controller. We could hear their transmissions, but they could not hear us. With assistance from a helpful Air Emirates flight, we relayed our problem and stated our intentions. We also requested the arresting gear be rigged in case we got the same unsafe indications. We read aloud the emergency-gear-extension and the field-arrestment procedures to refamiliarize ourselves.

Our discussions were constantly interrupted by our inability to understand ATC, which led to further confusion among the crew as my ACO and radar officer (RO) were reading ahead in the pocket checklist. In retrospect, sticking to the adage, "aviate, navigate, communicate," would have mitigated the chaos. The approach controller was ready for us when we switched over, but upon check in, we couldn't determine which end of the runway had the arresting gear rigged.

We were cleared to hold overhead the field with about 30 minutes of fuel remaining. We did a quick pass for familiarization, and had tower do a visual landing-gear check. As suspected, we had misunderstood the tower controller, and the runway with the gear rigged was opposite what approach had passed. With one more pass, we dropped our gear, and to our frustration, received the same unsafe indications as earlier. We ran through the emergency-extension procedure with no joy and prepared for the field arrestment.

We told tower that we were ready to commence. They promptly cleared the pattern and gave us the "OK." We prepared for the worst-case scenario: a gear collapse on touchdown. We removed the CIC ditching hatch and tightened our seat straps. Our CAPC talked our pilot through the descent, as the crew in the back stayed silent.

We touched down, engaged the cable and came to a full stop. As we did, the gear indicator switched from barber poles to down and locked. With a sigh of relief, we contacted tower and told them our status. Tower wanted us to shut down the engines, so that they could move us out of the arresting gear. However, the E-2C needs a huffer to start, which the airfield didn't have. The CAPC and I decided that I would leave the aircraft to tell the ground-emergency personnel that we couldn't shut down, but that we could use reverse thrust to exit the wire.

I got out of the plane on the runway. After shaking hands with the base duty officer, I acted as plane captain and directed the aircraft out of the wire. The pilots taxied free of the arresting gear and headed to the transient line to hot pump for our return trip.

After some troubleshooting and coordination, we took off. Because we had expended our single shot of emergency gear-extension nitrogen, we left the gear down to avoid another unsafe indication,. The trip back to the ship was quiet, and we recovered.

As a junior mission commander with no experience with this type of situation, the term "helmet fire" was an understatement. So much information was pouring into the plane that we couldn't process it and effectively communicate. In retrospect, we should have stiff-armed some of the other contacts and focused on safety of flight, talking only with the rep and making sure the crew was on the same page.

Our discussions were constantly interrupted by our inability to understand ATC, which led to further confusion among the crew as my ACO and radar officer (RO) were reading ahead in the pocket checklist.

When it is your problem, own it. Take a deep breath and don't be afraid to give a few "stand by" calls on the radio while you make sure to complete things correctly. Also, don't be afraid to be conservative. In no way was lowering the gear in the stack going to hurt us. Some may think it was unnecessary, but our early check of the gear saved us a few thousand pounds of fuel, making our divert possible. Be ready for anything, even if it is just an easy day.

LT. SECCOMBE FLIES WITH VAW-125.

Gear Pins, Removed! Pubs, Check! Fuel Vent Plunger... Uh oh.

BY LT. JOEY ZERRA

By month five of an extremely hot, split-site deployment, our P-3C squadron employed several methods to combat complacency. We knew the last 30 days of our deployment would be a challenge. Our commanding officer enacted a comprehensive 30-30-30 plan to make sure we had a safe transition from the final months of deployment through the first month home. This plan identifies the first 30 days of a deployment, the last 30 days of deployment, and the first 30 days after returning home as the most dangerous times for aviation squadrons.

A fuel vent plunger like this one is used in P-3C fueling operations.

One of our flights during this end of deployment vulnerable period showed just what can happen. The crew was scheduled for a 10-hour surveillance flight. Bad weather was forecast in the operating area. The flight-station crew had a senior patrol plane commander (PPC), two junior copilots, a senior flight engineer (FE) and an unqualified nugget FE. The crew hadn't recently flown together, but they recognized many of the factors that could adversely affect their performance. They discussed operational risk management, get-home-itis and complacency.

While the pilots and senior FE conducted preflight checks, the junior FE fueled the aircraft. During fueling operations, FEs position a fuel-vent plunger up to the aircraft's fuel vents to feel for airflow, ensuring the fuel-tank venting system is operating.

Once this check is complete, the FE usually places the fuel-vent plunger at the base of the boarding ladder as a reminder to bring it onboard before takeoff. However, this junior FE had another plan, which was to place the vent plunger up through a hole (called the sonobuoy free-fall chute) in the aircraft. This technique

Fuel vent plungers are used to detect a correctly operating fuel vent system.

Crew's should avoid this "technique" of placing the plunger into the free-fall chute.

An interior look at a plunger stuck inside a free-fall chute.

is used by some FEs as a time-saving measure, but it creates a hazard because of the risk of forgetting to retrieve the plunger before engine start.

Before takeoff, our tactical coordinator (TACCO) checked the cabin to secure loose objects and to make sure the crew was ready for takeoff. The TACCO didn't notice anything out of place. The crew flew an 11-hour mission and returned to base without incident. Once on deck, the PPC was directed to see the XO. The XO explained that a serialized fuel-vent plunger, assigned to their aircraft, was found on the active runway during a FOD sweep.

The PPC returned to the aircraft to find both FEs looking for the lost fuel-vent plunger, which was required for postflight refueling.

The PPC then gathered his entire crew for a debriefing from the XO. Two days earlier, the crew had attended a safety briefing from the skipper discussing complacency, attention to detail and doing things by the book. The junior flight engineer felt overconfident because he had completed preflights for the past five months using the technique of pushing the fuel plunger up through the sonobuoy free-fall chute.

No one from our squadron or from the host country was injured, and no property was damaged as a result of this mistake. This airfield is owned by the host nation and supports host-nation jet aircraft.

Always be on the lookout for complacency in your squadron. The worst times for complacency can be categorized by the 30-30-30 rule.

Second, we recommend sharing this story with your squadron's aircrew who are responsible for fueling operations. Sending the plunger through the free-fall chute on the P-3C to save time is a dangerous practice and adds another level of risk to your mission. The extra 30 seconds it takes to walk the plunger up the ladder and secure it inside will prevent a hazard which could lead to a mishap. In our case, we could have had an incident with our host partner.

LT. ZERRA FLIES WITH VP-10.

Juanda, Weigh That Again

BY AWF1 (NAC/AW/SW/MTS) JASON GIBSON

Our C-40A crew launched from Atsugi, Japan, refueled in the Phillippines, and headed to Juanda, Indonesia. The day after we arrived, we were to embark a Marine Corps unit who needed to return to their home station of Futenma, Japan. They had arrived in Indonesia eight days earlier on a C-130 airlift.

A VR-58 crew loads a C-40A.

Though the language barrier was somewhat steep, once on deck in Indonesia, arrangements were made with the airfield staff to load fuel, cargo and personnel the following morning.

Our crew arrived the next morning to the satisfying sight of a fuel truck, loading equipment, 31 Marines and a single pallet. Business was conducted as usual, and our crew began their preflight duties and tasks. The pallet looked like it may have exceeded the 56-inch-height limitation of the C-40, so we monitored it closely during the loading evolution. Just as the pallet entered the plane from the K-loader, the crew chief noticed that there was a high spot on the pallet, which might not clear the overhead bins of the main cargo door when closed. The pallet was immediately offloaded, and items were removed from the pallet to meet the clearance.

When the pallet was fully loaded onto the plane, it seemed noticeably heavier than the manifested 1,800 pounds. I contacted the lift coordinator to question the true weight of the pallet. He assured me the pallet had been weighed at 1,800 pounds and presented the manifest of the cargo. The crew discussed the possibility of a discrepancy between pounds and kilos on the scale. I asked the lift coordinator, in the presence of the transport aircraft commander (TAC), about the weight. The lift commander confirmed that it was "1,800 pounds of cargo."

We requested the pallet be weighed again by the airport officials, but there were no scales available at the airport. Both pilots trusted my concerns and experience. The pilots and I discussed options and criteria for loading the pallet. My concern was exceeding the compartmental limits of the C-40A, specifically regarding weight/balance and center of gravity limits. We ran the weight and balance figures, along with various performance scenarios. We would have adequate power available because it was a single pallet, with only 31 passengers, at a runway just above sea level. Our concerns were weight and balance or exceeding compartment limits. The crew agreed that the pallet would be offloaded and half-way broken down to load a portion of the gear into aft, belly cargo area.

The Marines began unloading large bundles of copper wire. One bundle required six Marines to carry it. As the Marines and I struggled to load the wire, I put my mind at ease, confident my instincts had served me well. Eventually, the pallet had shrunk to about half the initial size. It was then netted and reloaded.

Once onboard, we agreed that the pallet was of a more manageable weight, with no indications of exceeding compartment limitations. The passengers were then loaded and the plane launched. Once airborne, the officer in charge of the airlift was contacted and briefed on the offloading plans at Futenma. We also wanted to have all of the gear that was removed from the pallet reloaded and weighed.

We requested the pallet be weighed again by the airport officials, but there were no scales available at the airport.

Once on deck in Futenma, the pallet was offloaded and all the gear was repalletized to get an accurate weight. The forklift took the pallet to the scales, where we learned that the pallet actually weighed 5,450 pounds. This weight, combined with the two nose tires, aircraft jack, door locks (O-comp) and hydraulic fluid/oil (P-comp), would have exceeded the combined, compartment-allowable weight of the planned pallet position of the "E" compartment. The C-40A Aircraft Loading Manual states the following formula:

[Compartment E+O+(0.5xP)=5640 pounds max].

Due to weight and balance and center-of-gravity issues on takeoff, this situation could have caused structural damage to the aircraft, possibly a mishap. Had the pilots not trusted my judgment as a loadmaster or had they rushed the crew to the point of not allowing a crewmember to pay close attention to detail, the outcome might have been different.

AWF1 GIBSON FLIES WITH VR-58.

A Routine Event

BY LT. JOHN LESTER

My T-34C was at Pensacola regional airport after flying weekend operations. I was scheduled to meet a student there, fly an event with him, then return to NAS Whiting Field. My student, however, called in sick. I decided to fly the plane back to Whiting Field and pick up my second student. This return flight is routine and takes only about 12 minutes.

I moved all my gear to the front cockpit, secured the rear cockpit for solo flight, and performed a normal preflight inspection. After engine start, I headed to the runup area for a normal runup and control check before taxing to the Bravo intersection of runway 17. Once cleared for takeoff, I added power and started my takeoff roll. At 80 knots, I smoothly pulled back on the stick and climbed out. When I could no longer make a safe landing, I retracted the gear.

I confirmed the gear was up-and-locked at about 200 feet. I felt the control stick come back in my hands about two inches, and the aircraft slightly nosed down. My first thought was that I had lost control of the elevator. My blood ran cold as I saw the trees looming ahead. I pulled back more and found that I could move the elevator, but the stick had extra play in it. Once I recovered from the initial shock, I continued my climbout, slightly moving the stick to determine the extent of my problem. It moved two to three inches fore and aft before the elevator would budge; moving the stick left and right moved the ailerons as normal. I quickly ran through NATOPS in my head and decided that this problem wasn't covered: I was on my own.

I was at 500 feet off the departure end of the runway. I still had control of the elevator, but something obviously was wrong. Do I continue the short flight to Whiting, or do I try to land it back at Pensacola? This decision was a no-brainer. I banked left to turn crosswind and told tower that I had a control malfunction. I declared an emergency and said that I wanted to land back on 17.

During the climb and level off, I tried to be as ginger as possible with the elevator, using trim and power more than elevator movement. I had no idea what was wrong with the aircraft. I knew that if I moved the stick and the elevator finally gave out, I would have no way to get out of the aircraft — I was below the bailout altitude. I briefly considered climbing for a precautionary emergency landing (PEL) but decided this plan would put too much pressure on the elevator. I would just level off at pattern altitude and bring it around.

At the 180, I kept the flaps up to minimize the amount of elevator needed in the flare. On final, I continued to use power and trim more than elevator. I brought it down to the runway using minimal flare. I had an uneventful taxi back and shutdown. I installed the control lock and inspected the elevator. There was no visible damage, but with the control lock installed, I manually could move the elevator about two to three inches up and down.

As it turns out, the gimble bearing for the elevator had slipped to the point where the gimble was not a snug fit to the control linkage. This accounted for the play in the control stick. This malfunction had never been seen in the T-34 fleet. Maintenance decided to inspect the T-34 fleet and found several aircraft with the beginning stages of the same problem.

We regularly fly from Pensacola regional, and repositions are very common. But, what was supposed to be a routine 0.2 hour flight turned into one of the scarier flights of my career. Flying an older aircraft, we tend to think that we've seen everything it could throw at us, but that isn't the case. The routine nature of this flight, combined with the unknown nature of the malfunction, makes this a flight I'll never forget.

LT. JOHN LESTER FLIES WITH VT-2.

Why I Made So Many Mistakes

I had experienced a minor case of DCS and a moderate case of AGE in the lungs and brain. The AGE was most likely aggravated at altitude, as I tried to clear my right ear while the pressure was cycling.

BY LT. MICAH PORTER

I would have noticed my cognitive problems earlier, but my ear hurt so badly that it distracted me. And to explain why my ear hurt, I need to go back to the beginning.

I was in sunny San Diego, supporting CVW-11's Strike Fighter Advanced Readiness Program (SFARP), and fly as a strike-fighter tactics instructor (SFTI) with a great F-18C squadron. I had been scheduled for a midafternoon flight, which gave me plenty of time to hit the gym before heading to work.

At 12:50 p.m., the flight lead hacked the clock and started the brief for an unopposed, day division, self-escort strike in the Superior Valley training range. After a brief of admin, tac-admin and flight conduct, we wrapped up and walked on our jets. During the maintenance logbook review, I saw a gripe in the aircraft-maintenance book (AMB) for a sudden loss of cabin pressure at roughly 25,000 feet. I also noticed the maintenance-action form had been signed-off by another pilot, who had flown the jet the previous day with no follow-on issues.

Soon after takeoff, Los Angeles Center told us to climb, maintain FL290 and proceed direct to the R-2508 complex. During the transit, I looked around in awe at the clear skies. You could see the Sierra Nevada Mountains rising in the distance from 80 miles away. Approaching R-2508, we were instructed to hold outside the airspace while other flights exited the target area. At about 3:20 p.m., our flight lead, realizing that

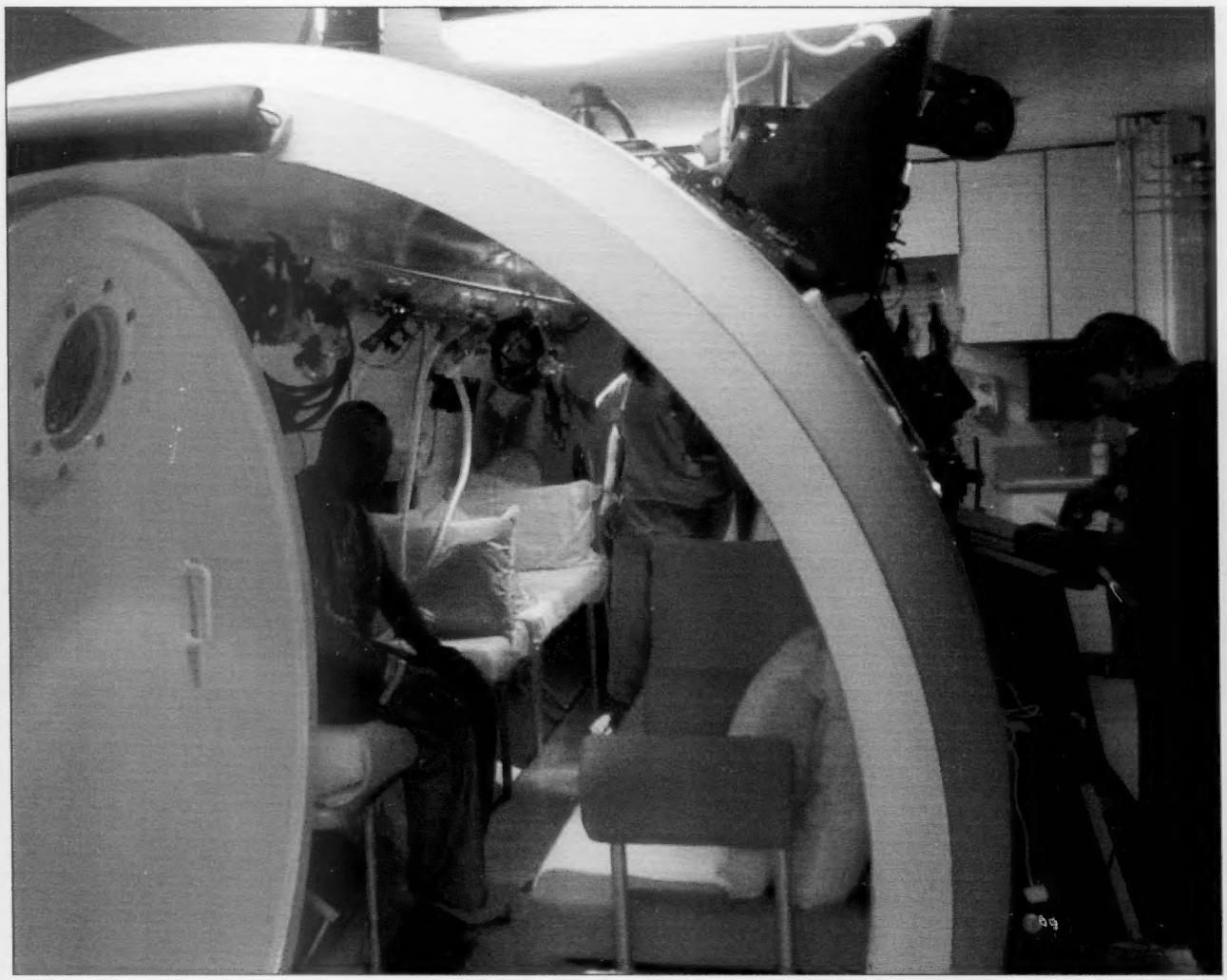
fuel was an issue, slowed to max endurance, and began a slow, left turn through north at 29,000 feet.

I suddenly felt my lungs fully deplete of air. It felt like a hand grabbed hold of my lungs and instantly squeezed out all the oxygen. With my mask on and no warning or caution lights, I became very confused and concerned. Initially, I thought my mind was playing tricks on me. I took a deep breath. My right lung felt like it had ruptured. Quickly scanning my DDIs, nothing seemed out of the ordinary until the pressure in my lungs cycled again.

Scanning my cabin-pressure gauge, I saw the needle swing through 29,000 feet, while my right ear felt like it had just burst. In the time it took me to execute my immediate-action items, the pressure had cycled from 8,000 feet to 30,000 feet at least four more times. Realizing I was in big trouble, I initiated my immediate-action items to get emergency oxygen and neutralize the cabin pressure.

I started a steep dive for the deck. After rapidly descending below 10,000-foot cabin-pressure altitude, I focused on clearing my right ear, which still was

The UCSD hypobaric chamber.



painful. I did the Valsalva maneuver multiple times, trying to equalize the pressure. I couldn't clear my ear, so I passed the section lead to Dash 4, an experienced flight lead. He started to coordinate our return to MCAS Miramar.

After discussions between flight leads on whether to divert into China Lake, the decision was made to get the jet back to Miramar. We'd return low at below 10,000 feet. Once Joshua Control gave us return clearance, I turned my attention back to equalizing the pressure in my right ear.

DURING THE RETURN FLIGHT, early symptoms of decompression sickness (DCS) and arterial gas embolism (AGE) began to surface. An early indicator of the deterioration of my cognitive skills was when the flight lead had to continually walk me through radio-frequency changes. My formation-keeping skills had eroded to the point where I had fallen two to three miles in trail. After several questions about my position from flight lead, I quickly turned my attention back to flying formation and closed the distance. In my mind, I chalked up these mistakes to task saturation brought on by flying form, trying to equalize pressure in my right ear and changing radio frequencies.

As we got closer to Miramar, we were directed to contact tower, who cleared us to descend and maintain 3,000 feet. We lined up for the visual approach to runway 24R. Still in pain, I told flight lead that I would need a very gradual descent to try to clear my right ear. He obliged, and finally, as I approached 3,500 feet, my right ear cleared and the pain stopped.

Relieved, I now thought the worst was over and landing would be a piece of cake. We decided that I would fly my approach first and lead would take separation on final. Detaching around 10 miles from the threshold of runway 24R, I initiated my landing checklist.

I reported to Miramar tower, "Three down and locked."

I started my descent and was surprised when lead asked me if I planned to land or take it around. I said that I intended to land on that pass. Immediately, my wingman told me I was high and to start my descent. If I wasn't confused before this call, I definitely was now. After scanning my instruments, I quickly realized I was still at 3,000 feet, 210 knots, and my flaps were in the up position.

I decided to make a play for the deck. I dumped the nose and threw my flaps to full, then proceeded to push the landing. As I started my descent around three miles from the threshold, my airspeed crept up. Over the threshold, I realized I was not only high but also very fast. Good judgment would have dictated a go-around, but I wanted to put the aircraft on deck. Flaring early, I worked off airspeed and landed halfway down the runway.

Miramar Tower directed me to use the parallel taxiways and proceed to de-arm. Again, this direction was very confusing and led me to try to take a left onto runway 24L. With direction from lead, I rolled to the end of 24R and taxied clear. After pulling into de-arm, I became violently sick and vomited in my helmet bag and the cockpit.

I gathered myself, and we taxied to the line and shut down. The flight lead met me at the bottom of the ladder. He said my eyes were bloodshot and I looked drunk. Fresh air surrounded me, and I immediately felt better.

We debriefed with maintenance control and went to the ready room to call the flight doctor. After a full examination, the doc said I'd been hypoxic and should feel better if I stayed hydrated and ate dinner.

My mind continued to play tricks on me as I made my way back to the ready room. For the life of me, I couldn't remember whether I had turned in my classified material, or if I had placed my ejection seat in the safe position. Maintenance had checked and confirmed that my seat still was armed. I called them and apologized for my actions. I finished my required paperwork for SFARP accounting purposes.

At 7:30 p.m., with paperwork complete and stomach empty, I decided it was time for a little dinner before my next scheduled nonflying night event. I headed to my car, agitated and frustrated at how forgetful I had become. Not only had I forgotten my keys, but I had left my cover in the ready room. After 15 minutes, I

squared myself away and headed toward Rubio's for their delicious fish tacos. Having just been there the night before, I was familiar with the area.

I headed out the main gate and quickly became disoriented and lost, which sent me over the top. I remember thinking, "Wow, this is not going well." After 30 minutes of searching, I finally located the restaurant, ordered my food and headed back to the squadron. I ate dinner and prepared the paperwork for my next event.

After 15 minutes, my head began to hurt. I felt like I was going to pass out. Pushing through the pain, I prayed that if I could just finish the debrief without vomiting in front of the flight, this would be a mission success. At some point in the debrief, someone asked if I felt OK. I don't remember being asked, but apparently my response was slow and slurred. A few minutes later, I felt like my head was about to explode. I quietly excused myself and went outside to vomit. The squadron XO followed me out and heard me. He immediately called the flight doctor. The XO and flight surgeon decided to hustle me over to Balboa Naval Hospital.

Emergency-room doctors put me on IVs and 100-percent oxygen. One doctor thought I had a simple stomach virus. However, after hours of tests, I was on my way to a hypobaric chamber at the University of California at San Diego (UCSD), where a team evaluated my symptoms and subjected me to multiple cognitive-skill tests (which I failed miserably). The team struggled to diagnose either DCS or AGE. After running another chest X-ray and finding damage to my lungs, they quickly set up the hypobaric chamber.

Finally, 12 hours after the incident occurred, I was placed in the chamber and started my descent. Seeing as I was roughly 30,000 feet in elevation at the time of decompression, this was equal to three atmospheres or 60 feet in depth for my treatment table. Upon completing my treatment seven-and-a-half hours later and being reevaluated, I passed all cognitive tests, and my lungs, brain and heart were functioning at 100 percent.

Final Diagnosis

I had experienced a minor case of DCS and a moderate case of AGE in the lungs and brain. The AGE was most likely aggravated at altitude, as I tried to clear my right ear while the pressure was cycling.

What is an AGE?

It occurs when air bubbles are pumped into the arteries or veins due to rapid decompression. It is usually seen in divers, but as I proved, can easily attack the body at any altitude. Common symptoms are signs of a stroke or heart attack. For me, the signs pointed to a stroke with the loss of cognitive skills and reasoning.

Top Five Lessons Learned

If in doubt, execute your immediate-action items. Aircrew often lean on their experience and symptoms without fully understanding all of the aeromedical factors in play. We are aircrew, not doctors, so pull the emergency-oxygen green ring.

Aircrew should never treat a rapid decompression at altitude as trivial. Although you may not instantly feel the symptoms of DCS or AGE, they can debilitate your cognitive skills to the point that you aren't thinking clearly, and you can't make timely, accurate decisions.

Wingman responsibilities are not done once boots are on deck. Fortunately, I had an experienced wingman who recognized that something was not right and encouraged me to go to the flight doctor for evaluation. Even after being evaluated have someone shadow you for several hours to evaluate your cognitive skills. Do not go home alone.

Never allow yourself to get behind the wheel of a vehicle without being 100 percent. This decision could have had a tragic ending if I had experienced the same symptoms in a motor vehicle that I experienced a few hours later in the debrief.

Be proactive with medical care. Chamber rides are free. The effects of DCS or AGE can be permanent, even lethal.

LT. PORTER IS A STRIKE FIGHTER TACTICS INSTRUCTOR WITH STRIKE FIGHTER WEAPONS SCHOOL PACIFIC (SFWSPAC).

... we're going to continue to deal with new problems and emergencies. The correct answer may not always be in a checklist.

Know your NATOPS and your systems so you can better anticipate what is going to happen when things go south ... Know your crew ... so you're able to draw from their expertise in difficult situations. —Lt. Joshua Brown, VAQ-134